

STATEMENT OF DR. JEROME B. WIESNER,
DIRECTOR OF THE OFFICE OF SCIENCE AND TECHNOLOGY,
BEFORE THE SENATE SUBCOMMITTEE ON
REORGANIZATION AND INTERNATIONAL ORGANIZATIONS

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Mr. Chairman and Members of the Committee:

I am pleased to appear before your Committee to discuss the subject of scientific and technical information. We appreciate the interest your Committee has shown in scientific information and the many constructive summaries contained in its publications. You have focused in a direct way upon a central problem concerning the Government's scientific and technological activities--effective communication of technical information in a rapidly mounting research and development effort.

A number of Federal agencies have a long tradition of activity in scientific and technical information: the Department of Agriculture, Bureau of Standards, Smithsonian Institution, Library of Congress, among others. As a relative newcomer, the Atomic Energy Commission has organized a most extensive scientific and technical information program. The NASA is establishing an information program commensurate with the size of its R&D and its statutory responsibilities to make the results of its research generally available. Representatives of several agencies are here to report on their agency activities, progress, and future plans.

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Although the Federal agencies have long dealt with the needs for scientific and technical information in carrying out their missions, the problem has taken on new dimensions requiring concerted action at the Presidential level. This is the result of the rapid growth of government research and development to the point where a majority of the scientists and engineers are engaged in government-financed work. The R&D is growing in complexity and sophistication as well as in magnitude. All of this is taking place during a period of international stress and great demands on our national resources, requiring careful husbanding of time, funds, and scarce technical manpower. Thus, scientific and technical information in government has become a national problem and can no longer be considered on an agency-by-agency basis.

The Executive Branch has been carefully considering these questions; and is doing something about them. Although the Committee is generally aware of the organizational steps that have been taken, I would like to comment briefly on the efforts to come to grips with the technical information problem on a government-wide basis.

The Office of Science Information Service was established in the National Science Foundation as the result of a study under the President's Science Advisory Committee in 1958. This Office has operated to promote the development of better techniques for handling scientific information and to improve existing methods for disseminating scientific information. In March of 1959, the Federal Council for Science and

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Technology was established to enable more effective planning and administration of Federal scientific and technological programs. At the same time, the NSF was directed to provide leadership in coordinating the scientific information activities of the Federal Government. The NSF has made considerable progress in its efforts to improve the dissemination of scientific information. But it has achieved only limited success in developing a coordinated national scientific information system, since it has no administrative authority over other agencies. Agency-wide coordination is being achieved through the Federal Council for Science and Technology. In May 1962, the Council agreed that a high-level focal point of responsibility would be established in each agency to integrate and elevate the status of science information functions within their management. At the same time, the Council established a committee on scientific and technical information to develop government-wide standards and assure compatibility between agency systems. The committee is chaired by Dr. Brockway McMillan, Assistant Secretary of the Air Force for Research and Development.

During the past year a panel of scientists and engineers under the President's Science Advisory Committee has been hard at work on a study of the entire national scientific and technical information problem. The work of the panel was aided by a full-time task force staff which labored several months last spring to advise me on the organization and coordination of the scientific and technical information activities of the

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Government to best serve the needs of different management levels.

The most recent action to strengthen the Government's ability to guide the scientific and technical information activities of the many Federal agencies was the Congressional action barely three months ago to establish the Office of Science and Technology in the Executive Office of the President. This Office, under my direction, is providing the President with full-time staff support for the coordination of Federal science and technology functions. It is responsible for providing policy guidance in the matter of scientific and technical information, but it does not have authority to impose central direction and control. The Office has a professional staff member devoting full attention to this field. Similarly, the Director of Defense Research and Engineering will shortly engage, for the first time since the creation of that office, a person having major responsibility for scientific and technical information at the OSD level.

In your letter of invitation you asked that I address myself principally to the question "Where do we go from here and what does my Office propose to do to speed improvements in scientific information systems?". We are dealing with a matter of great complexity from technical and administrative standpoints. More than 35 government departments and agencies carry on scientific and technical information activities. Each agency must tailor its activities to its mission under separate legislative authority. Their management structure and organization differ. Not

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only must the technical information activities of these many activities be brought into harmony but they must be carefully related to the well developed private activities in this field. The studies by your Committee staff have provided a most useful input for considering these complex problems. However, in my view, it is necessary to move rapidly ahead with the planning and actions designed to strengthen government-wide management of scientific and technical information activities if we are to make the necessary progress in solving the specialized problems identified by your Committee. There is general agreement that the Committee has put its finger on an important problem, but there are some differences of view as to its severity at present. There is no difference of view that the problem is growing increasingly severe and that we need to mobilize our efforts to develop a comprehensive plan of action and the agency organization to carry it out; a plan and organization designed to satisfy top management as well as the bench scientist and engineer. Having essentially completed these major studies and with the organizational steps that have been taken, the stage is now set for the development of such a plan. The creation of the Office of Science and Technology permits the exercise of leadership and initiative necessary to handle a technical management problem of this magnitude and complexity. I intend to make a major effort to identify needed improvements and see that they are rapidly brought about.

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With these general remarks, I would like to comment on the nature of the problem and the opportunities for improvement as I see them.

Two simple, but essential points have emerged from our studies. First, scientific information is an integral part of research and development. Second, to cope with the ever increasing flood of technical information, all those connected with R&D--government agencies, technical societies, and individual scientists--will have to devote more thought, effort, and resources to technical information than in the past.

Solving the technical information problem will not, in itself, solve the problem of R&D management. Too often, good information handling is confused with good management. Good information is necessary for good management; but good information does not necessarily imply good management. For example, I do not agree with claims that inadequacies in the information system are principally responsible for inefficiencies in weapons systems development. Where deficiencies have occurred, they have been attributable much more to shortcomings in individuals--in their sophistication, their knowledge, possibly their education--than to faults in our information system. Make no mistake about this point. The number one deterrent to more efficient management of Federal scientific and technical programs is a shortage of an adequate number of outstanding scientists and engineers with management experience. There are many reasons for this, including the fact that the national effort in these fields is growing faster than the supply. In this period of short supply,

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government salaries are inadequate to compete with other employers and consequently less than a proportionate share of the most able people are attracted to government employment.

Nor does more information automatically mean better information. We are already deluged with a flood of documents. The principal need is not improvements in mechanical retrieval systems, though better automation is desirable. We need a way of switching information, not documents, to the user in as discriminatory manner as possible. The user should be informed, not overwhelmed.

Often the entire burden of information handling is placed on the documentation community--on the librarian and the automatic retriever. This overlooks the fact that information is not documents--that a pile of documents on a manager's or researcher's desk is of little use; it is information that he needs. As the volume of information grows, it will need to be transferred more and more through the mediation of a highly skilled, highly trained scientist or engineer who can sift, review, compact, and digest the information contained in reports and put the information into a form that can readily be used.

The development of information scientists will require more effort on the part of everyone connected with R&D. We will need to encourage and kindle the interest of some of our best scientific talent for this work. This will involve some diversion of scarce, high quality technical manpower to the information task; but it will greatly enhance the

effectiveness of the entire scientific and engineering community. Such information scientists should be located where research and development is going on--big government laboratories or contracting establishments--at specialized information centers. The over-all information system of the future will have many specialized information centers as its central switching devices. It will transmit suitably packaged information from the central depository, operated either by the technical society or by the Government, to the individual user. One could liken this to the Legislative Reference Service of the Library of Congress. A related facet of this problem is the need to train scientists and engineers to make more effective use of the information available to them. We should encourage the technical schools and universities to develop more effective education in this aspect of technical work.

In deciding how to deploy the resources of Federal agencies, we need to keep in mind that each agency faces two rather separate, though related problems. It must maintain an effective internal communication system; and it must do what is necessary to aid the development of an effective over-all government communication system. Further, the government and non-government systems are interwoven, and the government must pay close attention to the non-government systems if it wishes to keep its own system effective. The government must assume responsibilities toward those parts of the non-government systems that do not overlap with its own, as well as those that do, simply because

government has assumed such heavy responsibility toward research.

The tasks of the Federal agencies can, therefore, be summarized in rather straightforward fashion as follows:

- First, the Federal agencies must clearly and consciously accept responsibility for information activities that are relevant to their missions. The technical and mechanical inconsistencies between agency information systems--differences in format, in indexing, in compatibility of abstracting, in initial distribution and the like--are matters which are being handled by the NSF's Office of Science Information Service with the guidance of the Federal Council for Science and Technology. On the other hand, inconsistencies in the attitude of agency managers toward information is another matter. As long as information is considered important by some agencies and unimportant by others, some will have an aggressive technical information system, others a weak one. All agency managements must come to recognize that information is an essential product of their agency's operation whether or not Congress has so directed, and that the control and dissemination of information is a vital part of research and development. Through the establishment of a focal point of responsibility for technical information in each agency, a highly placed official will see to it that information activities in his agency are sensible and vigorous. This highly placed official must be a part of the agency's research, not of its administrative management. His job is to determine how much and what kind of information processing should

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be done. He would be expected to compare his agency's information activities with those of other agencies, and would ensure proper handling of the technical literature for which his agency is responsible. He would identify needed research and development projects in scientific and technical information relevant to the agency's mission. He must be supported in this work by an adequate, high quality technical staff versed in the problems of information handling.

- Second, each agency must maintain its internal system in effective working order. The internal communication system is based on informal technical reports. Suggestions for improving the handling of this report literature should be considered, such as:

- a) evaluating technical reports before they enter the internal information system;
- b) publishing critical technical review journals covering the report and open literature, thereby extending the experience with successful AEC journals to appropriate fields of primary interest to DOD and NASA;
- c) establishment of additional specialized information centers handling publications and keeping abreast of all developments in its field. The job of preparing state-of-the-art reviews and otherwise interpreting the literature would be a responsibility of the specialized centers.

- Third, government-wide scientific and technical information clearinghouses are needed to integrate the agency systems with each other

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and with the non-government information systems. Some of the needed clearinghouses are in existence, but a general strengthening of these is necessary.

a) The Science Information Exchange will need to bring its activities in the physical sciences up to the excellent standards of quality, coverage and timeliness it has established in the biological sciences. There are major difficulties in recruiting the professional staff for indexing and proper handling of information in the physical sciences. It is more difficult and time consuming to interest qualified scientists and engineers in work of this character at the prevailing wages for this activity than has been the case for biologists where it is possible to recruit qualified women. The SIE has also experienced greater difficulty in the physical sciences in acquiring current research data from government agencies where considerable administrative work is required to transfer it in a form adapted to SIE use. The Federal Council Committee on Scientific and Technical Information has given first priority to the problems of the SIE; and we are exploring the need for fiscal and administrative measures to reinforce and strengthen its important work.

b) A national Technical Referral Service is being established by the Library of Congress to direct inquiries to the proper depository or specialized information center.

c) Additional attention will need to be given to timely government report announcement and distribution and the strengthening of the

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Office of Technical Services to more adequately serve this function on a government-wide basis.

In conclusion, I conceive the information system in the Executive Branch of Government to be an interlocking system of agency systems kept under surveillance by the Federal Council for Science and Technology and operating under the policy guidance of the Office of Science and Technology. While developing strong interconnecting agency systems, we must take care that the government information systems not overwhelm the non-government activities, particularly those of the technical societies which are especially sensitive to the needs of the users. The process of scientific communication with its long tradition of self criticism plays an indispensable role. The existence of a healthy, impartial system of scientific communication helps assure the country that the science it supports is valid. The first scientific information panel of the President's Science Advisory Committee insisted on an articulated, rather than a centralized, scientific communication system to maintain independent avenues of scientific criticism. It is my strong belief that these considerations are still valid, and that the measures I have outlined will help the government and non-government systems develop into an effective interwoven instrument that is responsive to the changing needs of our science and technology, but will assure the non-government system a necessary freedom of action.